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NEW AUTOMATIC TELEPHONES

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Discussion of diagram and construction of new automatic telephones (coin telephones) of the AMT type now in production.

In 1951 one of the plants of the Ministry of the Communications Equipment Industry has started regular production of new automatic coin telephones ("taksofon") of the AMT type, intended for use as public telephones.

The AMT type coin telephone (Figure 1) is a wall set in a silumin case, painted with a dark nitro-lacquer. On the outside of the case are the coin slot, the dial, a button for calling special services, a coin return chamber, and a name plate with explanatory notes. The rear wall of the case is made of sheet steel and has five holes: four holes are used for fastening the set to the wall, and all serve for the entrance of the line and signalization wires. The coin box is placed in the lower portion of the case, which is equipped with a side door.

The handset, made of silumin, is suspended on a heavy lever and is connected to the set by a 5-conductor cord. This cord is placed in a spiral hose made of 1-mm chrome-plated wire. The earphone and the mouthpiece of the handset are made of plastic and are fastened to the body of the handset by means of brass screws which can be unscrewed only with a special screwdriver. All the metal protions of the automatic telephone are nickel plated, to protect them against corrosion.

The circuit and the construction of the automatic telephone have the following features. (1) They make it possible, upon payment of 15 kopecks, to establish telephone connection with any subscriber of the municipal telephone network to which the automatic telephone is connected; (2) They make it possible to establish connection without pay with any of the special services to which a 2-digit number is assigned (fire department, militia, ambulance, etc). (3) If the called subscriber answers, the money inserted is deposited automatically. (4) If no connection is made, (subscriber called does not answer, number busy, calling subscriber hangs up before the other party answers), the money is returned. (5) It is possible to install an outside bell if it is necessary to receive incoming (service) calls. (6) An alarm system can be installed. The coin telephone is designed to be used with the equipment provided in mechanical or step-by-step automatic telephone stations to re-polarize the station battery across the conductors of the coin telephone line whenever the called subscriber answers.

The principal units of the coin telephone are: the base, on which are mounted the terminal plate, the locks and sets of springs used in the signalization circuit, the handset which has a capsule telephone type TK-47 and a capsule microphone type MK-10, the coin box with a capacity of 1,000 15-kopeck coins (placed in a special section of the case), the removable panel (subpanel) on which are mounted the circuit and the mechanical equipment.

The removable panel (Figure 2) comprises the following: coin mechanism 1, transformer 2, 2 selenium rectifiers 3, coin-deposit electromagnet 4, 2 capacitors 5, terminal plate 6, set of signalization springs 7, lever installation 8, dial 9, coin contact 10, depositing contact 11, push button 12

for calling the special services, set of springs for the push button 13 for calling special services, coin chute 14, spiral spring 15, and a set of springs 16 for the lever switch. The removable panel is fastened to the case with the aid of hinges and nonremovable screws. When this panel is mounted, the contact of its terminal plate becomes inserted in the contacts of the terminal plate of the base, thereby effecting a dependable connection between the portions of the electric circuit. The placement of the semi-finished articles on the removable panel permits their rapid inspection in case of necessity, makes it possible to remove the coin mechanisms without disturbing the electric circuit, and permits ready replacement of individual units.

Figure 3 shows the coin mechanism of the AMT type coin telephone. The following is the key to this drawing: 1 -- coin receiver, 2 -- shelf of shutter, 3 -- return chamber, 4 -- pawl of flywheel rod, 5 -- flywheel rod, 6-- slide lock, 7--distributor, 8--flywheel, 9--stop for push button for calling special services, 10 -- spring for flywheel rod, 11 -- pawl of flywheel, and 12 -- coin deposit rod. When the coin mechanism is in its initial position (handset suspended on arm) the flywheel is engaged with a tooth on the armature of the coin-deposit electromagnet, and the pawl of the flywheel rod is under the roller of the coin-deposit rod.

The coin receiver and the coin chute are placed on the reverse side of the coin mechanism. The walls of the coin receiver are the base of the coin mechanism and a movable callibrating plank, which is connected by means of a flat spring with the lever installation. The callibrating plank is so adjusted, that only one 15-kopeck coin can pass through the slot between it and the base of the coin mechanism.

The coin chute is formed by the base of the mechanism and by a flat plate attached at a fixed distance from the mechanism. The upper portion of the mechanism has an opening, into which the lower edge of the shutter shelf fits. Between the base and the flat plate a distributor has been placed, which is a triangular plate connected to the coin-deposit rod. When the coin deposit rod is in its initial position, the distributor prevents the coin from entering into the coin box.

The coin mechanism works in the following manner. The 15-kopeck coin dropped into the coin slot passes into the coin receiver, rolls over the plank of the coin receiver and is stopped at the entrance to the coin chute by the valve shelf. When the handset is taken off the hook, the lever installation, acted upon by a spiral spring, rises and tilts the calibrating plank of the coin receiver. At the same time the lever installation turns and thereby lifts the flywheel rod. When the rod moves upward the slide block becomes free and moves under the action of its spring, bears against the coin and causes the latter to close a coin contact as a result of which the set becomes connected to the line.

When the called subscriber answers, the coin-deposit electromagnet operates and pulls in its armature. The coupling between the flywheel and the electromagnet becomes disturbed and the flywheel, which is actuated by a spring, starts rotating. When the flywheel stops rotating its pawl comes out from under the roller of the coin-deposit rod. This rod, acted upon by its own springs, drops down, closes the coin-deposit contact, and moves the distributor away, thereby opening the path for the coin to the coin box. During the time that the coin-deposit rod moves downward the slide box moves backwards, thereby releasing the coin. The pawl of the slide block rod enters under the wedge of the shutter, the shutter tilts, its shelf comes out from under the coin, and the latter falls into the coin box.

At the end of the conversation, when the handset is replaced on the hook, all the parts of the coin mechanism return to the initial position. If the number called is busy, or the subscriber does not answer, then, after the handset is hung on the hook, the flywheel rod drops down and moves the slide block away. The latter releases the coin and tilts the shutter. The coin which is no longer held by the shelf of the shutter, falls into the coin-return chamber, for the path to the coin box is blocked by the distributor.

When the special services having 2-digit numbers are called, the set is connected to the line by pressing the push button. If a third digit is dialed, the blocking device of the dial disconnects the set.

The circuit employed in the AMT type coin telephone is the same as in the TAN-5MP telephone set, to which have been added the coin deposit electromagnet, selenium rectifiers, coin and deposit contacts, and a push button for calling the special services.

Let us trace the flow of current along the principal diagram of the AMT type coin telephone, as shown in Figure 4.

Calling the exchange. To call the station the handset is removed after first depositing a 15-kopeck coin. The current flows through the following circuit: plus of battery, wire L_1, winding I of transformer Tr, selenium rectifier SR_1, coin contact CC, contact D_2 (parallel to contact D_1) of the dial, contact 1--2 of the lever switch LS, wire L_2, minus of battery.

Dialing the number. When the number is dialed the following circuit is formed: plus of battery, wire L_1, contact D_3 of the dial, push button Pb, coin contact CC, pulsating contact D_1 of the dial, contact 1--2 of the lever switch LS, wire L_2, minus of the battery.

Collection of coin. When the called subscriber answers, a repolarization of the supply battery occurs at the station, and the flow of current in the line is reversed. As a result the resistance of the selenium rectifier SR_2, connected in series with the winding of the coin collection electromagnet CCE, decreases, and the resistance of the selenium rectifier SR_1, which is connected in parallel with the winding of this electromagnet, increases sharply. This causes operation of the coin-collection electromagnet, which receives a sufficient flow of current over the following circuit: plus of battery, wire L_2, contact 2--1 of the lever switch LS, contact D_2 (parallel with contact D_1) of the dial, coin contact CC, winding of electromagnet CCE, selenium rectifier SR_2, winding I of transformer Tr, wire L_1 and minus of battery.

When the coin is collected the collection contact DC is closed.

Conversation. The microphone is supplied over the following circuit: minus of battery, wire L_1, winding I of transformer Tr, microphone M, collection contact DC, wire L_2, plus of battery.

The incoming conversation current flows along the following circuit: wire L_1, winding I of transformer Tr, telephone T, windings III and II of transformer Tr, capacitor C_1, contact D_2 (parallel with contact D_1) of the dial, contact 1--2 of the lever switch LS, wire L_2.

Calling special service with 2-digit number. To make a free call to any special service the handset is removed and the push button Pb depressed. In this case the following circuit is formed: plus of battery, wire L_1, winding I of transformer Tr, microphone M, contacts of push button Pb, blocking contact D_5 of the dial, contact D_2 (parallel with contact D_1) of the dial, contact 1--2 of the lever switch LS, wire L_2, minus of battery.

Type AMT telephones operate reliably at considerable fluctuations of ambient temperature (from - 40 to + 50°), thereby insuring clear audibility of speech over a circuit having an operating attenuation of 4 nep with a background noise of 60 db. The impedance of the line to which the coin telephone is connected, should not exceed 2,000 ohms for automatic telephone stations of the mechanical system, or 1,000 ohms for automatic telephone systems of the step-by-step system.

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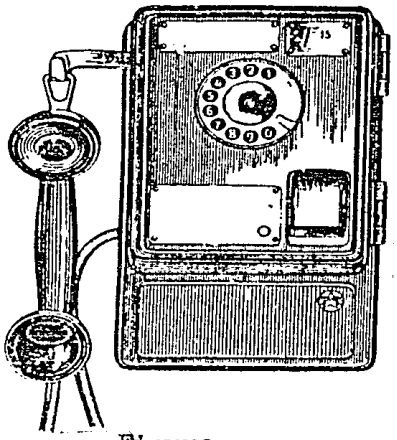

Figure 1

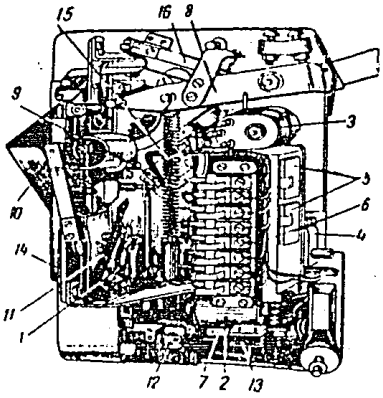

Figure 2

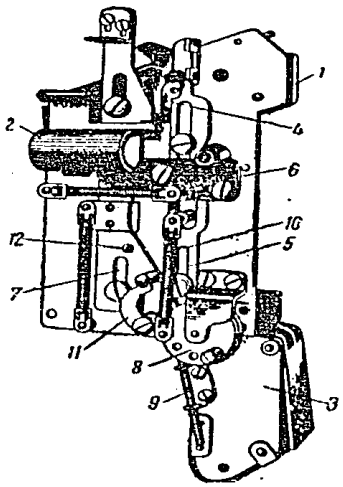

Figure 3

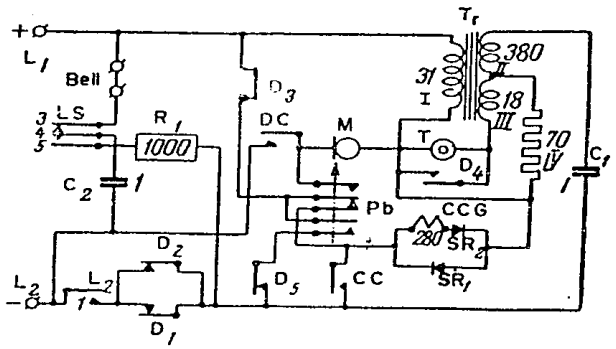

Figure 4

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